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ABSTRACT

A 10-week study examined whether the use of computers could be more effective than basal readers for improving reading comprehension at the primary level. Subjects, 12 students from the second grade, were divided into two groups, 6 in the experimental group using computers only and 6 in the control group using basal readers only. Both groups used the H.B.J. Basal Reading Program's workbook. The students were given pre-and posttests using the Gates-McGinitie Reading Test, vocabulary and comprehension sub-tests, H.B.J. Reading Program's unit tests, and five selections on the computer using materials developed by Janet Goldman and released by Hartley Courseware. Results suggested that the use of computer-assisted instruction may be more effective than basal readers for improving reading comprehension at the primary level. (Four data charts are included.) (RAE)

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THE USE OF COMPUTERS VERSUS BASAL READERS FOR READING COMPREHENSION IN THE PRIMARY GRADES

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Janet M. Goldman

THE RESEARCHER'S CREDITS

Janet Goldman has been teaching for over 30 years. She has a master's degree in reading, is approved to teach the emotionally disturbed, socially disadvantaged and the learning disabled. Janet Goldman is an author of primary reading comprehension stories and skills for Hartley Courseware. Her credits include; Scuffy and Friends; Kittens, Kids and a Frog; and Chariot, Cougars and Kings. Her newest programs just released by Hartley Courseware are Tim and the Cat and the Big Red Hat; and Frogs, Dogs, Kittens & Kids Skills I and II. Janet Goldman along with her husband, Ronald Goldman, operate Headmaster Ltd., a computer-assisted learning center in Country Club Hills, Illinois.

INTRODUCTION

In the United States the usual reading proceedure for instructing children,at the primary level, is the use of a basal reading program. Often primary teachers will determine a student's comprehension by the basal reader and the accompaning workbook. However, relying solely upon a basal reading program is often not the most effective method to teach comprehension. (Durkin, D., 1981) It may be difficult to conclude if students understand all that they read from a basal reader. Therefore, isn't there another alterniative other than using basal readers for evaluating reading comprehension?

Some schools and teachers have used other methods for assessing a student's comprehension in the primary grades. Some of these methods are language/experience, individual reading instruction and computer-assisted instruction.

For the past eight years I have been using computer- assisted instruction in a public school second grade in conjunction with a basal reading program. due to the high degree of concentration and motivation, studends are spending more time on task on the computer than with a basal reader. However, I had no solid evidence to support the fact that their comprehension had improved. A thorough computer search was made at Governors State University for any research about reading comprehension in the primary grades using computer-assisted-instruction. There was none to be located.

This leads to the question: can computer-assisted-instruction effectively be used to develop and measure comprehension in place of basal readers in the primary grades? Therefore, the purpose of this study is to discover if the use of computers can be more effective than basal readers for improving reading comprehension at the primary level.

PROCEEDURE

Selection of Students

In order to demonstrate if computer-assisted-instruction can be more effective than basal readers for improving reading comprehension in the primary grades, I selected my second grade. I am the regular classroom teacher. My husband, Ron, was the computer instructor. He has been volunteering his time in my room for the past eight years as a computer instructor. We conducted the entire study.

This was a comparitive study of two groups of students. 12 students were selected based upon SAT scores in reading comprehension and total reading, administered in February of the first grade. The 12 students were placed into 6 pairs matched as evenly as possible. One from each pair was selected at random for the experimental group which used computers and the other 6 were the control group which used basal readers. (See chart A).

Equipment Selected for Study

The experimental group used two Apple IIe computers with one disk drive each, one ten inch colored monitor for each computer, and one apple printer. To control the time that students were at the computers, each computer was outfitted with a stop watch.

The experimental group used Hartley courseware exclusively for this study. The specific programs used were "Scuffy & Friends", Primer level; "Kittens, Kids & a Frog", Primer thru second grade; Chariots, Cougars & Kings", third & fourth grade levels; "Brick by Brick", first and second grade levels. For the stories the suggested readability levels were from Spache and Fry.

The control group used the HBJ Reading Program (1987). The specific basal readers used were "Wishes", Primer level (Level 4); "Smiles", first grade reading level (Level 5); and "Streamers",1st half of second grade (Level 6). The grade levels are suggested by the publisher.

The Grouping of Students & Length of Time Reading

The experimental group came to the computer in pairs of 2, each having an individual computer. An opaque divider separated the computers and students; therefore, students were isolated from one another during the reading session. 2 students, A1 & A2, began reading at the primer level, 2 students, A3 & A4, began reading at the second half of first grade, and 2 students, A5 & A6, began reading at the second grade level. Each student was alloted an average of 20 minutes of reading time per day.

The control group students came to the reading table with their respective reading groups. They read in a reading group of 3 to 5 students. 2 students, B1 & B2, began reading at the primer level, 2 students, B3 & B4, began reading at the second half of first grade, and 2 students, B5 & B6, began reading at the second grade level. The control group read for an average of 20 minutes per day.

THE STUDY

Prior to beginning the study, the 12 students selected were given a pre-test consisting of the Gates-McGinitie Reading Test (1978), vocabulary and comprehensions sub-tests, Level B, Form 1. In vocabulary, the raw scores ranged from 7 to 27 with a mean of 16. The experimental group ranged from 11 to 27 with a mean of 17. The control group ranged from 7 to 24 with a mean of 15. In comprehension, the raw scores ranged from 8 to 37 with a mean of 21. The experimental group ranged from 15 to 29 with a mean of 24. The control group ranged from 8 to 37 with a mean of 18. (See shart B)

The study was ten weeks in length. It began on September 7th and ended on November 12th.

The experimental group's stories began with a full screen picture. The students discussed what they observed and made predictions about the story. Then the experimental group read their selections silently. Following the reading they answered every question at the end of each eposode. The students were not allowed to re-read selection once it left the monitor, even though the re-reading option was available. Students received immediate feed back. If they answered correctly they were given a possitive response in words or annimated figure. If answered incorrectly, students were given a second chance and sometimes hints were given before students' second try. Students knew at the end of a selection how many they answered correctly on the first try compared to the total. The answeres were recorded automatically in the students record file by their specific skills. The student file can be viewed on a monitor or printed out. Therefore, instructors and/or students can evaluate their performance and observe strengths and weaknesses.

The control group was asked to make a pre-reading prediction about the story by looking at the pictures at the beginning of each story. During guided reading, students first read each episode silently and then the teacher asked the whole group questions from the manual. Often students were asked to support their answer from the text. This permitted students to re-read their material. However, students in the control group only got a chance to answer some questions. The teacher or another student would give feedback. The answers were not recoreded: therefore, the teacher had no way to evaluate the students' performance. Post reading questions were asked in the same way. Next, the teacher directed the students to the one workbook page which referred to the story. Students then individually completed this page. This was the only written form of evaluation.

During the 20 minute reading session both the experimental and the control groups were asked to sound out words that they could. Otherwise, the instructors would tell them the words.

At the conclusion of the 20 minute reading session, both groups worked individually in the HBJ workbook. All 12 students completed 4 pages consisting of vocabulary, phonics, grammer, drawing conclusions, cause & effect, main idea, predicting outcome. Only 4 of these skills were presented each day, however, over the 10 week study all of these skills occurred.

EVALUATION

Post-tests

Three means of evaluation were used to measure the experimental and control groups in reading comprehension. The three measurements used for evaluation were the Gates-McGinitie Reading Test, The H.B.J. Reading Program reading levels' unit tests, and reading comprehension questions from Hartley Comprehension software.

At the conclusion of the study the students were first given a post-test by the Gates-McGinitie Reading Test, (1978), vocabulary and comprehension sub-tests, Level B, Form 1. In vocabulary, the raw scores ranged from 17 to 37 with a mean of 25. The experimental group ranged from 17 to 37 with a mean of 27. The control group ranged from 19 to 29 with a mean of 23. In comprehension the raw scored ranged from 3 to 36 with a mean of 25. The experimental group ranged from 21 to 32 with a mean of 28. The control group ranged from 3 to 36 with a mean of 22. (See Chart B).

The second instrument for measurement was the H.B.J. Reading Program, (1987) reading levels' unit tests. Four students, 2 from the experimental group and 2 from the control group, took 2 Primer unit tests and 2 1st grade reader unit tests. There was a total of 4 vocabulary sub-tests and 6 literal or inferential comprehension sub-tests. Four students, 2 from the experimental group and 2 from the control group, took 3 first grade reader unit tests, with a total of 3 vocabulary sub-tests and 5 literal or inferencial comprehension sub-tests. Four students, 2 from the experimental group and 2 from the control group, took 4 second grade reader unit tests, with a total of 4 vocabulary sub-tests and 2 literal or inferential sub-tests.

The third instrument used were the reading comprehension questions from Hartley comprehension software. Five Hartley Courseware selections

Post-tests (continued)

were used for comparison because of its ability to breakdown and record individual comprehension and vocabulary skills. These skills are main idea, detail, vocabulary, sequence, cause and effect, drawing conclusions, judgment/characters' feelings, predicting outcomes and pronouns. All the skills mentioned were in all of the reading selections. Two students, A1 & B1, were measured at the 1st and 2nd grade levels. Two Students, A2 & B2, were measured at the 2nd and 3rd grade levels. Eight students A3, A4, A5, A6, B3, B4, B5, & B6, were measured at the 3rd and 4th grade reading levels. For a breakdown of scores see Chart C.

Prior to taking the third instrument for measurement, the contol group was given a week of using the computer to familiarize themselves with the format and proceedure of usina Hartley Courseware.

EVALUATION

Results

The first measurement was the Gates-McGinitie Reading Test. In vocabulary, the experimental group's pre-test mean was 17 and the post-test mean was 27, a gain of 10 points. In vocabulary the control group's pre-test mean was 15 and the post-test mean was 23, a gain of 8 points. In comprehension the experimental group's pre-test mean was 24 and the post-test mean was 28, a gain of 4 points. In comprehension the control group's pretest mean was 18 and the post test mean was 22, a gain of 4 points. This measurement indicated that there was no difference between the experimental group and the control group.

The second measurement was the H.B.J. Reading Program unit tests. Both the experimental group and the control group passed almost all unit tests. In the experimental group A2 did not pass a sequence sub-test and one vocabulary sub-test. In the control group B1 did not pass a character traits & feelings sub-test. This measurement also indicated that there was no difference between the experimental group and the control group.

The third measurement was using 5 comprehension selections from Hartley Courseware. Neither group had read the selections before. A general overview of the comprehension skills are found on Chart D. The experimental group measured higher than the control group in all skills except main idea. Skills in which there was a larger difference between the experimental group and the control group were in Detail, drawing conclusions, judgment/character's feeling, and predicting outcome. It is also important to mention that the experimental group was able to complete selections in less time than the control group.

CONCLUSIONS AND DISCUSSION

This study was conducted for the prupose of discovering if the use of computers can be more effective than basal readers for improving reading comprehension at the primary level. 12 students from my second grade were selected. Six were in the experimental group using computers only and six were in the control group using basal readers only. Both groups used the H.B.J. Basal Reading Program's workbook.

The students were given a pre & post tests using Gates-McGinitie Reading Test, vocabulary and comprehension sub-tests, Form B Level 1. There was no particular difference between the experimental group and the control group. This is an indication that the use of computers could be used in place of basal readers.

The second evaluation was the H.B.J. Reading Program's unit tests. The unit tests were determined by the reading levels of the control group. Generally all students past the vocabulary and comprehension sub-tests. A2 did not pass one of the four vocabulary sub-tests. Due to A2's limited background, A2 had difficulty with all reading selections because of vocabulary deficiency. Even though the experimental group did not read the basal reader, this did not impede their vocabulary and comprehension. Therefore, it is evident that the use of computers can replace basal readers.

The third measurement consisted of five selections on the computer using Hartley Courseware. The control group used the computer daily for a week prior to the test so that they would become familiar with reading selections on the monitor and answering questions without re-reading. The experimental group did better in all skills except main idea. Skills

which showed a greater difference were predominately were inferential in nature. These included drawing conclusions, judgment/character's feelings and predicting outcome. This is an indication that students using computers can develop a greater ability to infer than reading from a basal reader.

There may be some contributing factors to the experimental group being able to infer using the computer than the control group. One factor may be that the experimental group was not permitted to re-read passages once they left the monitor during the study. Therefore, the were required to interpret information as the selection unfolded. Another contributing factor may be the concentration students developed when using a computer as opposed to being in a group using a basal reader. Also the experimental group ended the study reading at a higher level than the control group because they could read at their own pace.

In summary it is my opinion that the use of computer-assisted instruction is more effective then basal readers for improving reading comprehension at the primary level. Therefore, I feel that a greater emphasis should be placed on comper-assisted-instruction in the primary graders.

CHART A

RESULTS OF SAT TEST TAKEN IN FEBRUARY

Scores by Grade Level

*Student	Reading Comprehension	Total Reading
A1	K.7	1.1
B1	1.1	1.1
A2	1.3	1.2
B2	1.3	1.4
A3	1.6	1.6
B3	1.5	1.6
A4	1.6	1.8
B4	1.8	1.6
A5	1.6	1.8
B5	1.8	1.9
A6	2.0	2.0
B6	2.0	1.9

*A = Experimental Group

B = Control Group

Numbers after the letters correspond to the matched pair.

CHART B

RESULTS FROM THE GATES-MCGINITIE READING TEST

*Student	Pre-test		Post-test	
	Vocabulary	Comprehension	Vocabulary	Comprehension
A1	11	15	20	24
B1	14	8	20	3
A2	12	25	17	21
B2	16	19	20	23
A3	20	25	30	31
B3	16	15	24	23
A4	27	23	37	32
B4	7	9	24	22
A5	18	28	32	30
B5	13	17	19	26
A6	15	29	24	32
B6	24	37	29	36

*A = Experimental Group

B = Control Group

Number after the letters correspond to the matched pair.

CHART C

Individual Scores from Reading Comprehension Questions from Hartley Courseware

STUDENTS	MAIN IDEA	DETAIL	VOCABULARY	SEQUENCE	CAUSE/EFFECT	DRAWING CONCLUSIONS	JUDGMENT/ CHARACTER'S FEELINGS	PREDICTING OUTCOMES	PRONOUNS
A1	4/5*	12/14	7/7	3/3	3/3	8/8	3/3	6/6	2/3
B1	3/5	10/14	1/7	1/3	2/3	5/8	1/3	3/6	1/3
A2	2/6	11/17	5/9	4/6	3/5	6/9	2/4	3/6	2/4
B2	3/6	11/17	4/9	4/6	4/5	6/9	4/4	5/6	4/4
A3	5/6	10/17	6/7/	4/4	7/7	16/18	8/9	5/6	2/2
B3	5/6	10/17	5/7	3/4	5/7	8/18	6/9	3/6	1/2
A4	3/5	12/14	3/5	3/4	4/6	13/15	8/9	5/5	2/2
B4	3/5	6/14	3/5	2/4	5/6	8/15	3/9	2/5	0/2
A5	4/4	12/12	4/5	2/3	4/5	9/11	6/6	4/4	1/1
B5	3/4	10/12	5/5	3/3	4/5	7/11	3/6	4/4	1/1
A6	3/5	10/15	4/5	3/4	6/6	13/15	8/9	4/5	2/2
B6	5/5	10/15	5/5	3/4	6/6	12/15	7/9	5/5	1/2

*Number of questions answered correctly/ Total number of questions

CHART D
Five Selections from Hartley Courseware
Comparison of Experimental & Control Groups

SKILLS	GROUPS		# of TOTAL QUESTIONS
	*(A)	(B)	
Main Idea	21	22	31
Detail	67	57	88
Vocabulary	29	23	38
Sequence	19	16	24
Cause & Effect	27	26	32
Drawing Conclusions	65	46	76
Judgments/Character's Feelings	35	24	40
Predicting Outcomes	27	22	32
Pronouns	11	9	14

* A = Experimental Group

B = Control Group